UNCLASSIFIED- INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION - 1960

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INFORMATION ON INTERNATIONAL GEOPHYSICAL COOPERATION --

SOVIET-BLOC ACTIVITIES

(Final Issue)

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I. GENERAL

Publication of New Series on the Climate of the USSR

The following report appeared in a recent issue of "Izvestiya."

Leningrad, 17 November (TASS). The staff of the Main Geophysical Observatory im. A. I. Voyeykov has decided to publish a series of monographs entitled "The Climate of the USSR."

The monographs will contain various information concerning the climatic resources of the USSR in the largest physical geographic regions of the country. All such data are of very great importance for the construction industry, the planning of new enterprises, for the purposes of agriculture, etc.

The first monographs have already been published. These are devoted to the climate of the European territory of the USSR and the Far East. Monographs on the climate of the Caucasus, Central Asia, and Western and Eastern Siberia have been fully prepared for publication at the Main Geophysical Observatory.

The publication of the series "The Climate of the USSR" will be completed in 1962. ("Climate of the USSR," unsigned article, Izvestiya, 18 November 1960, p. 6).

Soviet Achievements in Space Technology Exhibited in Moscow

The pavilion of the Academy of Sciences of the USSR at the Exhibition of the Attainments of the National Economy in Moscow contained displays this year which reflect the new successes of Soviet scientists and their growing contributions to the development of science and technology.

The greatest amount of attention was attracted by the section on the conquest of space. It showed data on the remarkable scientific achievements of the Soviet people who have created a powerful spaceship and who, for the first time in history, have successfully brought about the return of this ship and the living creatures aboard after many revolutions around the Earth.

Because of this material the two exhibition halls set aside for space science have been completely rearranged. The halls contain the models and replicas of the satellites and the rockets which have reached various altitudes, their parts, and individual instruments used for investigation of space. These very familiar objects have previously absorbed the attention of hundreds of thousands of visitors to the pavilion. This year there has been added a replica of the automatic interplanetary station and its phototelevision apparatus used in photographing the far side of the Moon. The shell of this unique apparatus encloses a number of automatic instruments and mechanisms whose precise and reliable operation has provided world science with a document of the greatest significance -- a map of the surface of the Moon which is invisible from the Earth.

At the end of the second hall, as if to provide a transition to the third hall, where the latest attainments in Soviet physics are exhibited, there are instruments of an original design, without equals abroad. These instruments include an acoustic anemoscope and acoustic thermometer; these are being exhibited this year for the first time. They were developed by the Institute of Physics of the Atmosphere. All known methods of direct measurement of air temperature are essentially unsuitable at altitudes greater than 25 to 30 km due to errors of inertional and radiational character (the heating of the thermometric body by solar radiation). Radiosondes and bimetallic temperature units are characterized by errors which almost double with an increase in height by each 5 to 6 km. Their readings are already incorrect at a height of 12 km, and at a height of 30 km the errors amount to 30°. The acoustic thermometer has readings which are based on the measurement of the time of propagation of a sound wave (it has been established that the velocity of sound depends only on air temperature, and not on pressure); it is practically free of such errors due to the absence of a thermometric body and at the present time is used for correcting radiosonde readings. The importance of the new instrument can be fully appreciated if we remember that hundreds of radiosondes are sent aloft daily, not only in our country, but throughout the world. (The article is accompanied by a photograph captioned as follows: "Instrument for radioacoustic measurements of atmospheric temperature at heights of 10-40 km.")

The section on seismology has also received new exhibits. The instruments are from the Institute of Physics of the Earth im. O. Yu. Shmidt. One of the new instruments is the SRZO-2 seismograph. In contrast to other seismographs, which record weak and very distant earthquakes, it is designed for the recording of displacements of the soil during strong and destructive earthquakes. It is activated only by a jolt of major proportions (intense earthquakes are a rarity, so it is inexpedient to have continual recording). A second instrument is the VBP-3 seismic receiver. It is used to record vertical and horizontal movements of the ground and structures for displacements with an amplitude from 1 to 100 mm in a range of frequencies from 1 to 100 hertz. Finally, there is a third instrument, a tiltmeter. This instrument has photoelectric recording with an accuracy up to 0.001 for measurements of the tilt of the Earth's crust; this changes under the influence of tidal forces which cause the deformation of the Earth. These tidal forces cause the Earth's surface to rise and fall each day (up to 40 cm in the vicinity of Moscow).

It should be mentioned that this year the field of biology is only represented in the pavilion of the Academy of Sciences of the USSR by a section on microbiology. This occupies a part of the third hall and the greenhouse which adjoins it; this area holds the basic exhibition of the Institute of Microbiology.

Marine microbiology is being intensively developed in our country in recent years. Three stands portray the work in this field which this year merited the award of a Lenin Prize. One of these stands

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carries a map showing the microbiological stations where observations have been made in the world ocean, plus a map showing deep submarine currents discovered by means of microorganisms. As a result of the expeditions conducted in 1956-1959 it has been established that equatorial and tropical waters are distinguished by a high bacteria content; Arctic and Antarctic waters, on the other hand, have a low bacteria content. Microbiological research in the Indian, Pacific, Atlantic and Arctic Oceans, and in the Norway and Greenland Seas has shown that equatorial and tropical waters penetrate into Arctic and Antarctic regions; counter-currents of Arctic and Antarctic water have been discovered even in the vicinity of the equator.

The second stand is devoted to a discovery made in the course of expeditionary work -- a class of microorganisms living at various depths in the Pacific, Atlantic and Arctic Oceans and in the Black Sea. These earlier unknown microorganisms are encountered in the water mass of the oceans from the North Pole to the equator. They are no thicker than 0.002 mm and the diameter of the spores which they propagate is about 0.001 mm. It is possible that this new class of microorganisms takes part in processes leading to the precipitation of iron, manganese and other elements on the floors of the oceans.

Work in the field of marine microbiology has considerable importance in practical respects, in addition to its theoretical value. It is used to determine the biological productivity of the various seas and oceans and for hydrology (in particular, for the study of the problem of the movement of water masses). The results of the study of the life activity of microorganisms at great depths can play an important role in an industry based on the utilization of the biochemical activity of microbes. These investigations, which are reflected on the third stand of the marine microbiology exhibit, have demonstrated that bacteria break down glucose more intensively under high pressure than at normal atmospheric pressure. In the former case, there is a change in the quantitative ratio of the decomposition products of glucose. (Excerpts from "Exhibits of 1960," Vestnik Akademii Nauk SSSR, No. 10, 1960, pp. 45-57)

Scientific Session of the Geography Department at Leningrad University

A scientific session of the Geography Department at Leningrad State University was held in the period 4-6 April 1960. It was devoted to the International Geophysical Year.

About 200 persons participated in the sessions and a total of 8 reports were delivered and discussed. The papers included the following: Prof. V. Kh. Buynitskiy -- "On the Origin and Tendency of Development of Shelf Ice in Antarctica"; Candidate in Geographical Sciences Ye. V. Maksimov -- "Origin of Modern Types of Glaciers in the Dzhungarian Alatau"; Prof. L. K. Davydov -- "Formation of the Water Regime of Rivers in the Sel'dar River System"; Prof. O. A. Drozdov -- "Several Peculiarities of

the Thermal and Radiation Regime and Atmospheric Circulation in the Vicinity of the Fedchenko Glacier in the Ablation Period"; University Reader B. P. Karol' -- "On Radiation Properties of Glacier Ice"; V. A. Dzhorzhio, A. B. Kazanskiy, V. N. Kolesnikova and M. A. Petrosyants -- "The Fedchenko Glacier and Climate"; Candidate in Geographical Sciences A. K. Ryumin -- "Geomorphology and Several Problems of the Glaciology of the Fedchenko Glacier and its Lower Feeders"; Senior Scientific Worker A. G. Pronin -- "On the Regime of Suspended Alluvium in the Sel'dar River at the End of the Fedchenko Glacier."

The reports will be published later in a special brochure. ("Geographers -- IGY," by V. P. Kryukov, Vestnik Leningradskogo Universiteta, No. 18, Seriya Geologii i Geografii, No. 3, 1960, pp. 161-162)

Ukrainian Brochure Mentions IGY Work of Soviet Training Vessels

A recently published 38-page brochure describes a voyage by the Soviet training vessel "Tovarishch." This sailing vessel and its equipment are described in some detail. The long itinerary described includes Egypt, India, Indonesia, and other countries bordering the Indian Ocean and the Red Sea. Only brief mention is made of the fact that research was conducted in accordance with the program of the International Geophysical Year. It is possible that Soviet vessels of the "Tovarishch" type make many meteorological and oceanographic observations. ("On a Sailboat Across Three Oceans," by V. F. Tereshchenko, Society for the Dissemination of Political and Scientific Knowledge of the Ukrainian SSR, 1960, 38 pages.

New Books and Other Publications of the Academy of Sciences USSR

Trudy Instituta Fiziki Zemli imeni O. Yu. Shmidta. 11(178). Voprosy Teoreticheskoy Seysmologii i Fiziki Zemnykh Nedr (Works of the Institute of the Physics of the Earth imeni O. Yu. Shmidt. Problems of Theoretical Seismology and of the Physics of the Earth's Interior). Moscow, 1960, 174 pages.

Contains works on the statistical theory of turbulence, on the effect of pressure on the coefficient of diffusion in solid bodies, the viscosity of the Earth's interior, and on other related subjects.

Trudy 14-y Astrometricheskoy Konferentsii SSSR (Kiev, 27-30 Maya 1958g) (Works of the 14th Astrometric Conference USSR [Kiev, 27-30 May 1958]). The Main Astronomical Observatory (Pulkovo)
Moscow-Leningrad, 1960, 80 pages, illustrated.

Trudy Instituta Okeanologii, T. XLI. Biologicheskiye Issledovaniya Vitvazya v Tikhom Okeane (Works of the Institute of Oceanology. Vol 41. Biological Investigations of the Vityaz in the Pacific Ocean).
Moscow, 1960, 268 pages, illustrated.
("New Books, Publishing House of the Academy of Sciences USSR"; Moscow, Vestnik Akademii Nauk SSSR, No 10, 1960, p. 120-121)

II. UPPER ATMOSPHERE

World's Largest Telescope Planned

Plans for a unique telescope reflector, whose main mirror has a diameter of 6 meters, have been approved by the technical council of the State Optical-Mechanical Factory in Leningrad.

Its total weight will be 630 tons, and it will be the world's largest astronomical instrument. The plans were drawn up in the Design Office under the direction of B. K. Ioannisiani, a recipient of the Lenin Prize. The main mirror will weigh 40 tons; the weight of all the movable parts of the telescope will weigh 540 tons.

Even with its immense dimensions and the great weight of its reflector it is considerably lighter and more compact than the telescope located in the United States. ("World's Largest Telescope," unsigned article, Ekonomicheskaya Gazeta, 5 November 1960, p. 4)

Soviet Book on Astrobotany Published

The following is a review of the Transactions of the Section of Astrobotanists, Volume 8, published at Alma-Ata in 1960. The 262-page publication was printed in 1,130 copies and sells for 17 rubles 60 kopecks.

"This collection of articles reports on the results of visual observations of the planet Mars during the time of the opposition of 1958 and the cartographic processing of photographic observations of the opposition by G. A. Tikhov during the time of the great opposition of 1909.

"A number of articles are devoted to spectral investigations of the Moon, Uranus, magnetic and nonstationary stars, and the asteroids Vesta and Eunomia; electric-photometric investigations of the Moon and Mars; study of twilight phenomena in the Earth's atmosphere and the results of spectrophotometric investigations of cultivated and wild plants."

("New Books," unsigned article, Vestnik Akademii Nauk Kazakhskoy SSR, No. 10 (187), October 1960, p. 109).

Meeting Held by Commission for Investigation of the Sun

A plenary session of the Commission for Investigation of the Sun of the Astronomical Council of the Academy of Sciences of the USSR was held in Kiyev during the period 30 May through 4 June.

Theoretical problems of the physics of flares and mechanisms for explaining the formation of high-energy particles and gamma radiation in flares were among the subjects discussed. The motion of gas in flares was examined in relation to its magnetic field.

An analysis of observations of the corona made at the time of the full eclipse of 30 June 1954 provided information on the polarization of the radiation of the several parts of the corona and the position of the coronal ray in space from observations of its polarization. On the basis of a photometric study of photographs of the corona a study has been made of its jet-like character. The physical properties of the transitional region between the chromosphere and corona were also analyzed; these were determined on the basis of rocket observations of the solar spectrum in the far ultraviolet.

Ye. A. Ponomarev reviewed the theory of the corona from the viewpoint of gas kinetics. Proceeding on the assumption that the corona is a plasma under the influence of the forces of gas pressure, gravitation, and electrical and magnetic fields, he has proposed an explanation for several structural forms of coronas. He also discussed the distribution of electron and ion temperature and the balance of energy in the corona.

A number of reports concerned the spectrophotometric study of prominences. A study has been made of the Balmer decrement, temperature, electron concentration, and turbulent velocities in prominences. Preliminary results were given concerning spectrophotometric observations of filaments and prominences made at a number of observatories.

Observations of magnetic phenomena on the Sun were discussed in relation to large-scale movements in the Sun's atmosphere; a theoretical examination was made of the penetration of the magnetic field into the corona; one paper covered the possible relationship between the variability of the Sun's total magnetic field and the escape of energy into the corona in the form of heat.

A large group of reports was devoted to problems of spectrophotometry of the photosphere and spots; still other papers discussed research on the radio-frequency emission of the Sun. Specific reports included one on observations of the motion of matter in the Sun's supercorona by recording the radio-frequency emission of the Crab nebula passing through the Sun's corona. Others dealt with the relationship between the motion of sun spots and change in the radio-frequency emission of the Sun, the statistical relationship between the sporadic radio-frequency emission of the Sun and ionospheric anomalies, the structure of the spectrum in the centimeter region of local sources on the Sun on the basis of data from observations of eclipses, and observations with a 22-meter radiotelescope (on a 8 mm wavelength) of the slowly changing component and sporadic emission associated with a flare.

A significant part of the reports and discussions dealt with the corpuscular radiation of the Sun.

Problems related to observations of the next full solar eclipse of the Sun on 15 February 1961 were discussed by a special commission consisting of representatives from observatories. It is planned to observe this eclipse from the ground and from aircraft flying at great altitudes. ("Expanded Plenary Session of the Commission for Investigation of the Sun," by G. M. Nikol'skiy, Vestnik Akademii Nauk SSSR, No. 10, 1960, pp. 104-105)

Academician Barabashov Reviews Present Knowledge of the Moon

The Russians expect that the study of the Moon will yield important data for the solution of a number of very important practical problems in geophysics, geology, cosmogony, and astronautics. The Moon will probably be the first heavenly body reached by Man -- with a flight requiring about 50 hours.

Although much is now known about that heavenly body, there is still no unanimous opinion as to the character of the surface layers of the Moon and of what rocks they consist. This is important information to know to ensure the safe landing of spaceships.

On the basis of research conducted at the Khar'kov Astronomical Observatory, it may be concluded that the rocks making up the Moon's surface resemble tufaceous rocks and volcanic ash on the Earth. Recent observations by the author have shown that the microrelief of the Moon's surface is very great. The surface may well be covered with sharp irregularities, with parallel crevasses and crushed tuff with grains 1-3 mm in size. Fine dust evenly covering an even surface does not give lunar observers the effects of light reflection.

The photometric structure of the Moon's surface is the result of the influence of internal forces, determining the macro- and microrelief, as well as of external forces which can exercise a substantial influence on its microstructure.

Existing data seem to indicate that on the average the Moon's surface is photometrically homogeneous and possesses the same degree of porosity. The difference observed between the seas and continents is relatively small. Nevertheless, they possess a somewhat different homogeneity. For the most part the continents are brighter than the seas; the porosity of the continents is greater than the porosity of the seas.

Thus, it may be said that the Moon's surface consists of extremely porous tufaceous rocks, possibly in a highly granulated state, with grains in the range of 1 to 3 mm. The same conclusions are reached by lunar research using VHF radiowaves.

The article contains considerable data on lunar thermal radiation; much of this data is taken from American sources.

Radio observations indicate that the loose or porous surface layer of the Moon has a thickness of about 10 cm. This does not contradict observations made by other methods.

The article then discusses the use of radar observations of the Moon and the results of some of these observations.

The fact that the Moon has no detectable magnetic field is an indication that it has no liquid core and that its constituents change but little from the surface to the center. Mention is made of observations of some residual vulcanism on the Moon.

Polarimetric observations by the Soviet astronomer Yu. N. Lipskiy show that the Moon has a gaseous atmosphere whose mass per unit area is 1/10,000th that of the Earth, while foreign observers suggest a figure of 1/230,000. Still others report a figure less than 1/1,000,000.

The author suggests that the many unanswered physical problems concerning the Moon will be answered by rockets, automatic interplanetary stations, spaceships, landings by man on the Moon's surface, and establishment of observatories on the Moon, in that order. ("New Stage in the Study of the Moon," by Acad. N. P. Barabashov, Vestnik Akademii Nauk SSSR, No. 10, 1960, pp. 32-36)

Leading Soviet Newspapers Feature Atlas of the Far Side of the Moon

The recently published Atlas of the Far Side of the Moon has been discussed in Izvestiya by Academician A. V. Topchiyev, Vice-President of the Academy of Sciences of the USSR and in Pravda by A. Mikhaylov, Corresponding Member of the Academy of Sciences, Director of the Main Astronomical Observatory in Pulkovo.

The atlas was prepared by scientists in Moscow, Leningrad and Khar'kov and put into final form by the Publishing House of the Academy of Sciences. The editors were N. P. Barabashov, A. A. Mikhaylov and Yu. N. Lipskiy.

Photo interpretation was difficult because the far side of the Moon was fully illuminated. As a result, there were no shadows to aid the interpreters. Interference in transmission caused additional problems in interpretation. It was therefore necessary to develop special methods which made it possible to increase the contrast on the photos by tens or even a hundred times. These methods are described in the new atlas.

About 500 features were mapped from the photographs. Depending on how many negatives showed a particular feature and how clearly the feature stood out, the details on the map were classified under three categories of reliability. Features in the first category are shown by unbroken lines; these features appear clearly on at least three negatives. Those in the second category are those features which appeared on at least two negatives and whose outlines were not entirely clear. Features in the third category are clearly visible on only one negative. Those in the second category are outlined with a broken line, while those in the third category are encircled by a dotted line. Formations that are darker than the surrounding surface are cross-hatched. Mountainous regions are shown by special symbols. The heavy broken line in the lower part of the map (reproduced in both articles) shows the boundary of the surface photographed by the automatic interplanetary station.

The atlas contains 30 enlarged photographs of the far side of the Moon and a catalog of all features delineated, together with their descriptions and coordinates.

Of the two articles, the one by Topchiyev contains by far the better description of this historic publication.
("Atlas of the Far Side of the Moon," by Academician A. V. Topchiyev, Izvestiya, 16 November 1960, p. 4, and "Reverse Side of the Moon," by A. Mikhaylov, Pravda, 16 November 1960, p. 6)

III. METEOROLOGY

The "A. I. Voyeykov" Briefly Described

The following is the full text of a recent article in Ekonomicheskaya Gazeta.

"Weather Ship" is the appelation given to the vessel which bears the name of A. I. Voyeykov, scientist and geographer. It has recently returned from its fourth voyage. The staff of the expedition conducted scientific research work in the Pacific Ocean for more than two months.

The vessel is equipped with the latest instruments and apparatus. It is a real floating institute with many laboratories. Atmospheric research is conducted with pilot balloons and radiosondes. Meteorological rockets are launched into the upper layers of the atmosphere from special apparatus; the rockets convey the necessary information to the vessel by radio signals.

Deep-water equipment has made it possible to study the distribution of hydrometeorological elements to depths of five thousand meters.

Observations of temperature, pressure, humidity, precipitation and wind direction and velocity, together with hydrological research, has made it possible to collect new data which will ensure more thorough long-range weather forecasts. ("Weather Ship," unsigned article, Ekonomicheskaya Gazeta, 4 November 1960, p. 3).

Remote Meteorological Stations Described

The Tevyaku meteorological station is situated in the Sikhote-Alin Range, surrounded for hundreds of kilometers by unbroken taiga, almost 300 kilometers from the small village of Gvasyugi. It takes about two weeks to reach the station by small boat. The four-man staff is headed by Stepan Tunsyanovich Kimonko, a native of the region. A hydrometeorologist, he is a graduate of the Sverdlovsk Hydrometeorological Technical School. The station, on the headwaters of the Khor River, is connected with the outside by radio. Weather reports are transmitted 18 times each day.

Another station of this type is the Chekunda station, situated at the headwaters of the Bureya River, one of the largest tributaries of the Amur. This river will one day be used to a greater extent than now; meteorological and glaciological observations, however, are a necessary prerequisite. ("Weather Sentries," by F. Nigey, Ekonomicheskaya Gazeta, 10 November 1960, p. 4)

Methods for Measurement of Air Temperature on Shipboard

There is no generally accepted method for the measurement of air temperature on shipboard for meteorological purposes. Special research was conducted in the Arctic in 1956-1957 aboard the vessels "Ob'" and

"Lena" for the purpose of comparing various methods for measuring air temperature on shipboard and the selection of the simplest and most representative method. The following four methods were used: 1) on booms; 2) in a psychrometric booth; 3) using the ship's telemeteorographic station (SDS); 4) on the bridge, using the Assmann psychrometer. These four methods are each the subject of an individual paragraph in the article cited below.

The author concludes that the simplest and most representative method for determination of air temperature on shipboard is that recommended in the "Instructions" for observations with the Assmann psychrometer, suspended on the windward side of the vessel below the bridge. In no case should thermometer readings for meteorological purposes be made from wall thermometers because some cases are observed in which their readings deviate from the true values by 5 to 10°. ("On the Evaluation of Different Methods for Measurement of Air Temperature on Shipboard," by L. S. Petrov, Vestnik Leningradskogo Universiteta, No. 18, Seriya Geologii i Geografii, No. 3, 1960, pp. 145-146)

Patent Granted for Improvement of Radiosonde Signal Reception and Recording

The following is the description of a patent issued to A. L. Zlatin, V. A. Usol'tsev, A. N. Volosevich, B. S. Kozhinskaya, and A. S. Antoshina.

"A device for the automatic reception and recording of signals from a radiosonde in free flight with a two-letter system of coding. It contains a unit connected to the output of the radio receiver for the conversion of low-frequency signals into a voltage gradient and an electromechanical recording device. It is distinguished by the fact that for the purpose of automatic deciphering and signal recording there is a selector for the separation of voltage gradients by duration and amplitude, a decipherer for converting the combination of signals of the two-letter code into a combination of figures in the decimal system, and a memory unit on whose output there is an electromechanical recording device." (Patent description, from Section 42 -- Measuring Devices and Instruments, Byulleten' Izobreteniy, No. 23, 1959, p. 54)

Five Natural Synoptic Regions in the Northern Hemisphere Defined

A researcher at the Institute of Geography of the Academy of Sciences of the USSR has developed the concept that in both winter and summer there are five natural synoptic regions in the Northern Hemisphere, each of which is characterized by special circulatory conditions: the Atlantic and West Europe, East Europe and West Siberia, East Siberia and Kamchatka, the Pacific Ocean, and North America with Alaska.

All five are said to be homogeneous in synoptic respects in both winter and summer because they are under the influence of a single group of Arctic anticyclones. Each of these regions embraces a territory

within whose limits the underlying surface has an identical influence on atmospheric processes. ("The Displacement of Natural Synoptic Regions in the Northern Hemisphere," by Yu. V. Spiridonova, Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, No. 6, 1959, pp. 94-97)

IV. GRAVIMETRY

Special Requirement for Use of the SN-3 Gravimeter

A recent article in the journal "Geodesiya i Kartografiya" reports that no particular attention has been paid in the past to what position the instrument occupies in the periods between observations, while being transported and at stops. Investigations have shown that during such times these gravimeters should be maintained in a position close to horizontal, insofar as possible within the limits of 2°-3°.
("Remarks Relative to Work with the SN-3 Gravimeter," by P. F. Shokin, Candidate in Technical Sciences, Geodeziya i Kartografiya, No. 9, 1960, pp. 64-66)

V. LONGITUDE AND LATITUDE

Report on the Kitab Latitude Station -- An "Izvestiya" Report

The Soviet Union's first international latitude station was established thirty years ago in the southern part of Uzbekistan, not far from the rayon center Kitab. It was given the name of the outstanding Uzbek astronomer Ulugbek.

A zenith telescope was first directed into the sky at this place on 14 November 1930. On that date began continual observations of stars; these have made it possible to solve very important problems associated with the movement of the Earth's poles.

The Kitab station played an active role in the conduct of the program of the International Geophysical Year. Observations were made with two powerful zenith telescopes.

The regular All-Union Latitude Conference has been held in Leningrad. A. Kalmykov, Director of the Kitab Station, and scientific worker V. Shukhorov delivered reports concerning the results of observations during the International Geophysical Year. These reports were of great interest to the scientists present.

Considering the importance of the work done by the astronomers at Kitab, it was decided to hold the Fifth All-Union Latitude Conference at Kitab in the summer of 1960. ("Kitab Latitude Station," by N. Lozhkin, Izvestiya, 15 November 1960, p. 2).

VI. OCEANOGRAPHY

The "Voyeykov" Conducts Research in the North Pacific

The hydrometeorological vessel "Voyeykov" departed from Vladivostok early this year. It ran into a zone of storms near the 45th parallel, a region rarely visited by ships. The work of the aerologists and oceanographers was extremely difficult because their observations are ordinarily made when the ship is at drift.

The hydrologists defined the boundaries of the Kuro Siwo current more precisely and studied the distribution of temperatures at various depths. Cyclones arise when the warm waters of the Kuro Siwo meet the cold waters of the Kurile Current. The expedition's scientific program included study of the influence of the ocean on the atmosphere in the northern part of the Pacific Ocean.

After moving into tropical areas, the Soviet researchers launched meteorological rockets. The expedition has introduced corrections into atmospheric charts of a little-studied part of the Pacific Ocean. A powerful jet stream was discovered here at a height of ten kilometers; it moves at a velocity of 300 m per second.

The "Voyeykov" is to continue its work in the Pacific Ocean; it has now been joined by the "Shokal'skiy." ("In a Zone of Storms," by G. Baranova, Vokrug Sveta, No. 10, October 1960, p. 59)

The Structure of the Antarctic Divergence Zone

An article in the Izvestiya of the Academy of Sciences of the USSR, Geographical Series, presents significant data concerning the Antarctic divergence zone. ("On the Problem of the Structure of the Antarctic Divergence Zone," by Yu. A. Ivanov and B. A. Tareyev, Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, No. 6, 1959, pp. 82-89)

Antarctic Whaling Grounds Related to the Antarctic Divergence

Important biological research in Antarctic waters is being carried on by Soviet researchers, especially in whaling grounds. The article cited below is a significant contribution to the literature on this subject.

All the principal whaling grounds in the high Antarctic are associated with accumulations of krill in regions of pronounced upwelling of water in the zone of Antarctic divergence, in the centers of cyclones. This point is expanded on at considerable length.

Figure 2 is an interesting map of the number of whales taken in different sectors of Antarctic waters in 1954-1955. ("The Antarctic Divergence and Whaling Grounds," by K. V. Beklemishev, Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, No. 6, 1959, pp. 90-93)

Application of Radioactive Tracers in Oceanographic Research

This article describes a method used for investigating turbulent diffusion in the sea, based on the use of the radioactive tracer Iodine-131. Measurements made with a specially designed apparatus have made it possible to derive the value of the coefficient of turbulent diffusion. The coefficient varied from measurement to measurement between the values 5 cm^2/sec and 7 cm^2/sec.
("Determination of the Coefficients of Turbulent Diffusion in the Sea by Use of Radioactive Tracers," by B. A. Nelepo, Vestnik Moskovskogo Universiteta, No. 4, 1960, pp. 64-70)

VII. ARCTIC AND ANTARCTIC

Soviet Supply and Research Train Moves Southward

It is now spring in Antarctica. On 24 October three powerful tractors left Mirnyy and headed southward. Each of them towed expedition sledges heavily laden with barrels of diesel fuel, foodstuffs and other kinds of essentials.

The destination is Vostok, but visits will be made at Pionerskaya, Vostok-1 and Komsomol'skaya; the latter three stations are on a stand-by basis. The 13-man crew is headed by B. Krasnikov, chief of the expedition's transportation detachment. Included in this group is the American seismologist Dewart.

A wide range of scientific observations will be made while en route; seismic soundings will be made to determine the thickness of the glacier at a number of points.

In the first five days the sledge-tractor train covered 150 kilometers and has made gravimetric and glaciological observations at five points. ("Spring Trek," Nedelya (Izvestiya Sunday Supplement), No. 35, 23-29 October 1960, p. 2)

Apparatus and Method for Recording Temperature and Salinity of Ocean Water

The paper cited below gives a description of new apparatus which makes it possible to conduct a continual and simultaneous recording of the depth of submergence of the instrument, the temperature of the water, and its electrical conductivity (salinity). The apparatus is especially suitable for use in Antarctic waters. The name bathythermohalinograph is applied to this instrument. Salinity is determined from electrical conductivity. The use of the contactless method and special electronic systems makes it possible to record fluctuations in electrical conductivity (salinity). Recorded fluctuations in electrical conductivity in the surface layer of the ocean are cited. The autocorrelation function has been determined and the integral scales of inhomogeneities of the salinity field have been defined. ("Direct Recording of Temperature and Salinity in the Antarctic Sector of the Pacific Ocean," by G. G. Khundzhua, Vestnik Moskovskogo Universiteta, Seriya III, Fizika, Astronomiya, No. 4, 1960, pp. 47-51)

The Structural Geology of the Arctic

The article cited below is one of the most comprehensive reviews of the structural geology of the Arctic yet published. The article is accompanied by a large fold-out map with 42 different structural types symbolized. The presentation is broken down into three parts: 1) the

ancient platforms in the Arctic; 2) folded regions in the Arctic; 3) the origin of oceanic trenches in the Arctic. The text is cross-referenced to an extensive bibliography of 85 items, approximately half Soviet and half foreign.
("Some General Problems in the Structural Geology of the Arctic," by Yu. M. Pushcharovskiy, Izvestiya Akademii Nauk SSSR, Seriya Geologicheskaya, No. 9, 1960, pp. 15-28)

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